

## Release Notes

# hp StorageWorks File System Extender

**Product Version:** 3.1

First Edition (January 2005)

**Part Number:** AA-RW19A-TE

This document details supported hardware and software requirements for the HP StorageWorks File System Extender product. It also includes recommendations to optimize performance and discusses issues and possible solutions to overcome limitations.



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File System Extender Release Notes  
First Edition (January 2005)

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## about this guide

These release notes provide information about the supported hardware and software requirements in order to run the File System Extender software successfully. It also includes recommendations to optimize performance and provides workarounds to help overcome limitations and troubleshoot problems.

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**Note:** In these notes, unless qualified, the term *Linux* refers to all supported Linux distributions and the term *Windows* to all supported Windows operating system families.

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## Intended Audience

These notes are intended for use by system administrators who are experienced with the following (depending on the type of installation):

- SUSE LINUX Enterprise Server 8 (SLES 8) operating system
- Red Hat Enterprise Linux ES 3
- Windows 2000 Server or Windows Server 2003

You must have administrator's rights in order to perform the preparation of the operating system environment.

## Related Documents

In addition to this guide, HP provides the following information:

- *FSE Installation Guide* ([InstG.pdf](#) on the installation CD)

Intended for FSE administrators. Describes how to install the FSE components, explains possible FSE implementations, and introduces supported external clients. It contains necessary and optional installation tasks.

- *FSE User Guide* (UserG.pdf on the installation CD)

This guide is intended for FSE users. It describes basic concepts of the FSE system as well as typical tasks needed for administering the FSE system. It explains FSE policies and provides examples for FSE users.

- *FSE Management Console Reference Guide* (UIG.pdf on the installation CD)

This guide describes how to use the add-on FSE Management Console application, and easy-to-use tool that enables you to perform many FSE monitoring and administration tasks.

- *FSE Command-Line Reference*

Information on FSE commands with detailed description of the functionality and invocation syntax, installed as part of the FSE release software. The *FSE Command-Line Reference* is available on Linux systems as UNIX man pages (referred to as *FSE man pages*) or on Windows systems as Windows/HTML help (referred to as *HTML help for FSE commands*).

The same information is also provided in appendix B of the *FSE User Guide*.

## Getting Help

If you still have a question after reading this guide, contact an HP authorized service provider or access our web site: <http://www.hp.com>.

## HP Technical Support

Technical support information can be found at the HP Electronic Support Center:

- <http://www.hp.com/support>

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Description of the steps being performed

## HP Storage Web Site

The HP web site has the latest information on this product, as well as the latest drivers. Access storage at: <http://www.hp.com/country/us/eng/prodserv/storage.html>. From this web site, select the appropriate product or solution.

## HP Authorized Resellers

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP web site for locations and telephone numbers:  
<http://www.hp.com>.



# Supported Hardware and Software

## 1

This chapter provides information about supported hardware configurations, supported operating systems, and supported third-party software:

## Hardware Requirements

FSE software runs on systems with Intel i386 architecture. FSE can be configured either as a consolidated installation (where the FSE server and client run on the same machine), or in a distributed environment that allows the FSE server and FSE clients to be at different locations.

Both the FSE server and the FSE client must meet the following requirements:

- Intel Pentium III 500 MHz processor  
Newer processor series and/or higher frequencies are recommended.
- Minimum of 256 MB of RAM. 512 MB recommended.
- Network interface adapter card 10/100/1000 Mbps  
The FSE installation must be connected into the LAN.
- Fault tolerant disk subsystem  
Files on the disk that holds the HSM file systems and all FSE-related data (such as FSE databases and system files) must be stored on reliable storage. The best way to ensure safety is to put this data into the RAID subsystem.

An additional requirement for the FSE server is:

- Storage hardware connectivity  
Storage hardware connectivity to the FSE server requires a SCSI adapter card or an FC HBA supported by the operating system and the storage hardware.

## Supported Tape Drives and Libraries

The following storage arrays are supported:

Array Type	Comments
HP StorageWorks Enterprise Virtual Array 3000	FC drives and FATA drives
HP StorageWorks Enterprise Virtual Array 5000	FC drives and FATA drives
HP StorageWorks Modular Storage Array 500	SCSI drives
HP StorageWorks Modular Storage Array 1000	SCSI drives
HP StorageWorks Modular Storage Array 1500	SCSI drives and SATA drives

The following tape drives are supported. For the latest firmware revisions, consult the vendors of the tape drives and libraries:

Tape Drive Model	Supported Media Families	Required Firmware Revision
HP LTO Ultrium 1	LTO Ultrium 1	E38W
HP LTO Ultrium 2	LTO Ultrium 2	F38W
Sony SDX-500C	AIT-2	0202
Sony SDX-510C	AIT-2	0202
Sony SDX-500C/WM	AIT-2, AIT-2 WORM	0203 <sup>1</sup>
Sony SDX-700C	AIT-3	0202
Sony SDX-700C/WM	AIT-3, AIT-3 WORM	0202
Sony SDZ-100 (SCSI)	SAIT-1	0200
Sony SDZ-130 (Fibre Channel interface)	SAIT-1	0200
IBM LTO Ultrium 200	LTO Ultrium 1	4561 <sup>2</sup>
IBM LTO Ultrium 2	LTO Ultrium 2	4470

1. This firmware version enables WORM media detection.
2. Before updating the firmware in the tape drives, note that SCSI and Fibre Channel variants of the same drive may require the same firmware revision, but the actual firmware code files for each variant are different

The following tape libraries are supported:

Tape Library Model
HP StorageWorks MSL5000 Series Tape Libraries
HP StorageWorks MSL6000 Series Tape Libraries

HP StorageWorks ESL9000 Series Tape Libraries
INFINISTORE Tape Library (ITL) model E
INFINISTORE Tape Library (ITL) model M/AIT
INFINISTORE Tape Library (ITL) model M/LTO
INFINISTORE Tape Library (ITL) model XL/AIT
INFINISTORE Tape Library (ITL) model XL/LTO
BDT ThinStor (LTO Ultrium 1/AIT-3 autoloader)
Sony PetaSite tape library family

Refer to a more detailed support matrix for specific details of models, firmware and so on that are supported.

## Supported Operating Systems

### *Linux platform* **Supported Distributions**

FSE software runs on the following Linux distributions:

- SUSE LINUX Enterprise Server 8 (SLES 8), updated with Service Pack 3 (SLES 8 SP3)
- Red Hat Enterprise Linux ES 3 (RHEL ES 3), updated with Update 3 (RHEL 3 ES Update 3)

### **Supported Kernel Versions**

The following kernel versions can be used with the supported SUSE distribution:

- 2.4.21-138-default  
SUSE LINUX kernel for uniprocessor machines
- 2.4.21-138-smp  
SUSE LINUX kernel that supports symmetric multiprocessing (multiple processor machines) and up to 64 GB of RAM
- 2.4.21-138-smp4G  
SUSE LINUX kernel that supports symmetric multiprocessing and up to 4 GB of RAM

The following kernel versions can be used with the supported Red Hat Linux distribution:

- 2.4.21-20.EL

- Red Hat Linux kernel for uniprocessor machines
  - 2.4.21-20.ELhugemem  
Red Hat Linux kernel that supports up to 64 GB of RAM
  - 2.4.21-20.ELsmp  
Red Hat Linux kernel that supports symmetric multiprocessing  
(multiple processor machines)
- Windows platform* FSE software runs on the following Windows operating system:
- Windows 2000 Server, updated with Windows 2000 Service Pack 3 or later
  - Windows Server 2003, Enterprise Edition

## Software Requirements

The following third-party software packages must be installed before installing the FSE software.

### ***On Linux systems:***

- |                                  |                                                         |
|----------------------------------|---------------------------------------------------------|
| ■ Extended Attributes utilities  | ■ glibc locale C library                                |
| ■ Logical Volume Manager package | ■ Firebird SuperServer                                  |
| ■ E2fsprogs tools                | ■ Python interpreter                                    |
| ■ libgcc C library               | ■ Customized Samba package with<br>offline file support |
| ■ libstdc++ C++ library          | ■ tar archiving package                                 |

### ***On Windows systems:***

- *Windows 2000 Servers only:* StorageCraft VolumeSnapshot (*license needed*)
- Python interpreter
- Python for Windows extension
- Firebird SuperServer

Specific package versions and their relation to FSE components are provided in the *FSE Installation Guide*.

---

**Note:** Linux installation packages and the Windows installation process check that the appropriate software packages are installed.

---

## Supported Third-Party Software

On Windows systems with installed FSE software, the following third-party anti-virus software can be used:

- McAfee VirusScan Enterprise, version 8.0i
- Sophos Anti-Virus, version 3.87

To prevent data corruption, you must exclude certain directories on the FSE software installation tree structure from being scanned for viruses.

On a Windows FSE client, the following directory should be excluded:

- `%InstallPath%\var\part`

On a Windows FSE server, the following directories should be excluded:

- `%InstallPath%\var\diskbuf`
- `%InstallPath%\var\dm`
- `%InstallPath%\var\fri`
- `%InstallPath%\var\rmdb`

On a consolidated FSE system, all the above directories should be excluded.



# Last-Minute Changes

## 2

This chapter contains important last-minute changes that were too late to be included in the *FSE Installation Guide* or the *FSE User Guide*.

## fsecheck Command—match-media Option

The `--match-media` option for the `fsecheck` command can only be used in combination with the `--fsc-media` and `--autocorrect` options. The synopsis of `fsecheck --fsc-media` is as follows:

```
fsecheck {-m | --fsc-media} [--autocorrect [--match-media]] \  
PartitionName
```

When `fsecheck` is used with the `--match-media` option, the automatic correction process removes all entries in the File System Catalog that have not been found in the belonging Fast Recovery Information blocks on FSE media. An entry in this context means information about the location on the FSE media of any of the following: file generation, file copy, file split.

## Configurable Tape Medium Position Check

A minor improvement of the Back End Agent (BEA) functionality decreases the probability of data loss in SCSI bus reset events. Such events are not reported to the FSE system in certain cases and cannot be handled appropriately.

In FSE release 3.1, BEA can check the position of an FSE tape during write operations. By default, these checks are performed only with AIT and SAIT media. To enable or disable position checks for all supported media families, set the `HSM_BEA_VERIFY_POSITION` environment variable to one of the following:

- NEVER  
Disables tape medium position checks.
- ALWAYS  
Enables tape medium position checks for all supported media families.

## Updated FSE Partition Configuration Template

The template for FSE partition configuration files has been updated because of problems with offline internet shortcuts. A comment in the template now recommends excluding internet shortcuts from the release process. It also includes an appropriate example of the *ExcludeFromRelease* variable.

The following line in the FSE partition configuration template

```
# ExcludeFromRelease = ( *.ini, ".*[xy]??" )
```

has been replaced with the following lines:

```
# ExcludeFromRelease = ( *.url, *.ini, ".*[xy]??" )
#
# NOTE: It is recommended that you configure the FSE partition
# in \ such a
# way that you to exclude *.url internet shortcuts from \
# release. MS Windows Explorer
# may not be able to open such files if they are offline.
```

## New Variable HSM\_PT\_DIRECT in trace.cfg

By default, the FSE system uses direct SCSI pass-through mode for controlling SCSI devices. Some SCSI and Fibre Channel host bus adapters (HBAs) are not compatible with this mode, which may result in problems using the attached devices. To allow such HBAs to be used in the FSE system, there is a new variable *HSM\_PT\_DIRECT* in the file *trace.cfg*. Using this variable, you can switch communication with devices from direct SCSI pass-through mode to buffered SCSI pass-through mode.

To use buffered SCSI pass-through mode, uncomment the following line in the file *trace.cfg*, or add it if necessary:

```
# export HSM_PT_DIRECT=no
```

---

# Documentation Addenda

## Preparing Windows Systems for FSE Software Installation

### Disabling the Distributed File System (DFS) Locally

FSE system does not support Distributed File System (DFS) and cannot operate on systems where DFS is configured. Normally, you should not install FSE software on a system if DFS has been configured on it. To prevent DFS from potentially being configured while FSE is operating, disable DFS locally before starting the FSE installation.

---

**Note:** Disabling DFS on a system may affect the availability of the data shared through DFS on this system. Consequently, DFS clients are also affected.

---

To disable DFS on a local system, stop the DFS services and prevent them from being started automatically:

1. In Windows Control Panel, double-click **Administrative Tools**, and then double-click **Services**.
2. In the Name column, right-click **Distributed File System**, and click **Stop**.
3. Right-click **Distributed File System** once again, and click **Properties** to open the Distributed File System Properties window.
4. On the General tab, select **Disabled** from the Startup Type drop-down menu.
5. Click **OK** and close the Services tool.
6. Run Registry Editor by clicking **Start, Run**, and entering `regedit` in the Run text-box of the Run window.
7. Search for the following registry key and modify it with the suggested value:

```
\HKEY_LOCAL_MACHINE
\SYSTEM
\CurrentControlSet
\Services
\DfsDriver: Start [REG_DWORD] = 4
```

## Verifying and Modifying the Primary DNS Suffix of the System

Before you start installing FSE software on a Windows system, verify that the primary DNS suffix of the system is appropriately set. The full computer name should contain the fully-qualified domain name (FQDN) of this system.

Proceed as follows:

1. On the desktop, right-click **My Computer**.
2. In the System Properties window, click the **Computer Name** tab.
3. If the FQDN is displayed for **Full computer name**, the DNS suffix is already set appropriately. If only the host name is displayed, proceed with the next steps.
4. Click **Change...**
5. In the Computer Name Changes window, click **More...**
6. In the DNS Suffix and NetBIOS Computer Name window, enter the correct FQDN of the system.
7. Close all windows by clicking **OK**.
8. When prompted for the system restart, click **Yes**.

## Installing FSE Software on a Windows Terminal Server System

If you start installing FSE software on a Windows system that has Terminal Services software installed, an additional window named *After Installation* may open behind the FSE installation wizard window. This is a sign that the Terminal Services server is set to Execute mode. Before installing FSE software, you need to switch the server to Install mode:

1. Terminate the installation by clicking **Cancel** in the FSE installation wizard window.
2. In the command prompt, invoke the following command:  
`C:\>change user /install`
3. Restart the FSE software installation.

For more information about the Terminal Services server modes and installing software to a Terminal Server system, refer to the following web pages:

<http://support.microsoft.com/default.aspx?scid=kb;en-us;320185>

<http://support.microsoft.com/default.aspx?scid=kb;en-us;238357>

## HSM File System Access Modes

### Switching to Limited Access Mode

You can manually switch between Limited Access Mode (LAM) and Full Access Mode (FAM) as described in “Switching the Access Mode for an HSM File System” in Chapter 6 of the *FSE User Guide*.

However, LAM was designed to provide access to online files in emergency situations, for example, if the FSE system cannot be started up, the blocked Hierarchical Storage Manager (HSM) process cannot be terminated, and similar exceptional circumstances. Usually, you should avoid switching manually between HSM file system access modes, so only consider using the `fse --limit-access` command in the cases mentioned above.

### Limited Access Mode Error Messages

When an HSM file system is operating in Limited Access Mode, if access to an offline file or modification of HSM FS contents is denied to a third-party application, the application displays its own error message. Different applications therefore report different error messages.

#### Command Prompt (after the Windows' native copy command is invoked)

```
Incorrect function (0) files copied.
```

#### Windows Explorer (after an offline file is pasted or dragged over to another location)

```
Invalid MS-DOS function
```

### Limited Access Mode and the `fsefile --recall` Command

While an HSM file system is operating in Limited Access Mode, do not invoke the `fsefile --recall` command in order to recall offline files. In this operational mode offline files should not be recalled manually.

## Troubleshooting

### **During FSE system start-up on a SUSE LINUX system, some FSE processes are not started**

*Symptoms:* After invocation of the `fse` command on a particular FSE system host, some FSE processes that should be started on that host (consolidated FSE system, FSE server, or external FSE client) are not running.

*Explanation:* If the required FSE packages were installed on the host using a single `rpm` command, some of the packages may not have been installed correctly, due to unresolved dependencies. The reason for this is the `rpm` command included in the SUSE LINUX distributions, which does not automatically sort the specified packages in order to resolve their dependencies.

*Solution:* To check which packages have been successfully installed on the system:

1. On the command line, enter:  

```
# ls -a /etc/opt/fse
```
2. Inspect the command output for files that determine installed packages.

On a consolidated FSE system, check for the following files:

```
.agent.pkg  
.cli-admin.pkg  
.cli-user.pkg  
.client.pkg  
.common.pkg  
.server.pkg
```

On an FSE server, check for the following files:

```
.agent.pkg  
.cli-admin.pkg  
.common.pkg  
.server.pkg
```

On an external FSE client, check for the following files:

```
.cli-user.pkg  
.client.pkg  
.common.pkg
```

If any of the above files are missing, perform the following steps to reinstall the required packages:

3. Determine which packages you tried to install, as follows:  

```
# rpm -qa | grep "^fse-" | grep -v fse-gui.client.pkg
```

4. Reinstall all the packages listed in the command output. Use the sequence described in Chapter 5 “Installing FSE Software (Linux)” in the *FSE Installation Guide*, and the following command to reinstall each package:

```
# rpm -U --replacepkgs --replacefiles <PackageName>
```

### **Management Interface (MIF) seems not to be running**

**Symptoms:** Each time an FSE command is invoked, the following error message is displayed:

```
ERROR 6008: Cannot connect to Management Interface - probably
not running after system reboot. Requested name does not yet
exist in the NameService. Giving up.
```

**Explanation:** The local `services.cfg` file contains the fully qualified domain name (FQDN) of the FSE server host, where MIF is running. If the primary DNS suffix of this host is not set appropriately, the full computer name may contain only the host name. In this case, MIF registers itself in the CORBA Naming Service under a different name, and the FSE command-line interface cannot resolve it.

**Solution:** See “[Preparing Windows Systems for FSE Software Installation](#)” on page 15.

### **Multiple generations of the same file get different file IDs**

**Symptoms:** After a migrated file is modified using a third-party application, its new generation is migrated using a different file ID. The cause is the way the third-party application is handling the modification process. Such application creates a copy of the current file first and then modifies the copy instead of the original. After the copy is saved, the application renames the copy with the original filename and thus replaces the original. Examples of applications that use this approach to handle open files are `vi` (plain text editor) and Microsoft Word.

**Explanation:** Every time a new file is created on an HSM file system, a new unique file ID is generated for it and recorded in the belonging File System Catalog (FSC). If an already migrated file is deleted (not released) from the HSM file system and a new file with the same name is created in the same directory afterwards, the latter gets a different file ID.

**Solution:** Older generations of a file that was edited in such an application can be retrieved only using their file ID. To display the list of all migrated file generations, enter:

```
fsefile --history FileName
```

In the command output, search for a particular file generation and determine its file ID. Run the following, specifying the file ID:

```
fsefile --recall --id PartitionName FileID [--into Path]
```

**The fsecheck command cannot fix reported inconsistencies**

**Symptoms:** If you check for potential inconsistencies between a File System Catalog (FSC) and Fast Recovery Information (FRI) data on the corresponding FSE media, the following lines may be present in the output of the `fsecheck --fsc-media` command:

DUMP:	FSC	FRI	Notes
MigSize	<SizeInFSC>	<SizeInFRI>	<b>MISMATCH</b>
MigFlags	<FlagsInFSC>	<FlagsInFRI>	<b>MISMATCH</b>

The **MISMATCH** keywords indicate inconsistencies. After you invoke the command `fsecheck --fsc-media --autocorrect` to solve the underlying problems, these inconsistencies are not resolved.

**Explanation:** Corrupted FRI on the FSE media prevents the inconsistencies from being resolved. You have to recreate the FRI on the FSE media first.

**Solution:** 1. Run the following for each FSE medium that belongs to the problematic FSE partition:

```
fsemedia --recreate-fri Barcode
```

2. Invoke `fsecheck --fsc-media` again, specifying the `--autocorrect` option to enable automatic correction of inconsistencies in the FSC:

```
fsecheck --fsc-media --autocorrect PartitionName
```

**AIT-3 medium becomes unusable after power outage**

**Symptoms:** If an AIT-3 tape drive is switched off during migration to an AIT-3 tape medium, the medium becomes unusable. New data cannot be migrated to it nor can the already migrated data be recalled.

**Explanation:** A medium to which a migration was interrupted by switching off the drive cannot be rewound to a specific location/block, and the data cannot be read from the medium. Consequently, no FSE medium volumes on it can be accessed.

**Solution:** The problematic medium cannot be used in the FSE system any more. If another FSE media pool exists for the same FSE partition, the unusable medium contents can be copied to another medium in the pool. This way the data can be accessed again and the number of the configured migrated data copies is retained.

To create additional copies of data on this medium from other pools, enter:

```
fsemedium --copy-contents <Barcode>
```

**Limited Access Mode allows all Operations on an HSM file system**

*Symptoms:* On a Windows system, you can perform all ordinary file system operations on an HSM file system that is currently operating in Limited Access Mode. No file or directory creation, move, deletion, rename, and similar operations are prevented.

*Explanation:* Most probably the HSM file system filter cannot attach to the HSM file system, because the system native NTFS has already attached itself. A possible reason may be that you forgot to dismount NTFS from the disk volume that stores the HSM file system.

*Solution:* To detach NTFS from the problematic disk volume, enter:

```
C:\>fse --dismount-ntfs <VolumeName>
```

The HSM file system filter will attach itself to the disk volume when the HSM file system is accessed for the first time.

---

**Note:** The FSE system does not know about the files that were created while the HSM file system filter was not attached to the HSM file system. To expose these files to the FSE system, follow the procedure described in [“Enabling Early Migration of the Data Located on a Former NTFS Volume”](#) on page 27.

---

**Administrative jobs do not start to format re-added FSE media**

*Symptoms:* If you remove an FSE medium from its FSE media pool without physically removing it from an FSE library, then add it to whichever FSE media pool, and finally start an FSE administrative job to format the medium, the job seems to be blocked before formatting actually begins.

*Explanation:* When an FSE administrative job commands the Resource Manager (RM) to allocate a particular FSE medium, the RM cannot execute the allocation unless it knows the medium’s physical location in the FSE library.

After an FSE medium is added to an FSE media pool, the FSE library where the medium is located must be physically rescanned in order to record the medium’s location in the Resource Management Database (RMDb). The formatting can start after the medium location information is known.

*Solution:* Before starting to format the re-added FSE media, run the following command to physically rescan the FSE library. The command will add location information for the re-added FSE media into the RMDb:

```
fselibrary --update-inventory <LibraryName> --rescan
```

This also unblocks formatting jobs that have already started from waiting for the missing location information, enabling them to allocate the re-added FSE media and continue with execution.

**Red Hat Enterprise Linux system does not detect all units of the tape library**

*Symptoms:* On a consolidated FSE system or FSE server with an HP StorageWorks MSL library connected, after you query for detected SCSI devices, only the medium changer of the library appears in the list.

*Explanation:* The Red Hat Enterprise Linux kernel only detects devices with a LUN of zero. HP StorageWorks MSL libraries use different LUNs for each library unit (medium changer, tape drive, and embedded router). As a result, only the medium changer is detected and the library cannot be used.

*Solution:* 1. Add the following line into the file `/etc/modules.conf`:

```
options scsi_mod max_scsi_luns=255
```

2. Using the `mkinitrd` command, rebuild the initial RAM disk.

3. Restart the system.

4. Invoke the following command:

```
# echo "scsi scan-new-devices" > /proc/scsi/scsi
```

5. Inspect the output of the following command to determine if all missing devices have been detected:

```
# cat /proc/scsi/scsi
```

If the missing devices are listed, add the command you ran in step 4 to your Linux system startup script, in order to ensure that all devices are accessible after the Linux system is started up. You can now start using the FSE system.

If the missing devices are not listed, proceed with the next steps.

6. For each missing device, invoke the following command. In place of parameters *H*, *B*, *T*, and *L*, specify the HBA number, SCSI bus number, target SCSI ID, and LUN of the device, respectively:

```
# echo "scsi add-single-device H B T L" > /proc/scsi/scsi
```

7. Run the command from step 5 to verify that the missing devices have been detected.

8. Add each command that you ran in step 6 to your Linux system startup script.

## License Checker

Licence Checker is a command-line tool that eases reporting of the following status information pertaining to a particular FSE system set-up:

- Number of FSE clients configured to communicate with the FSE server
- Names and addresses of each FSE client

- Total offline storage capacity managed by the FSE server.  
Note that both tape and disk media are included in the storage capacity calculation.

For each configured FSE client (internal or external), Licence Checker reports the following values for the FSE client system:

- Fully-qualified domain name (FQDN)
- Host name
- IP addresses

Note that a particular FSE client may have several IP addresses, for example, when a private network is used for communication in the FSE system that is otherwise connected to a LAN.

Licence Checker is available on both Linux and Windows platforms, and can be run from the command shell on a consolidated FSE system or an FSE server as follows:

***on a Linux system:***

```
# cd /opt/fse/sbin/tools
# ./checklic
```

***on a Windows system:***

```
C:\>cd %InstallPath%\bin
C:\%InstallPath%\bin>checklic
```

The generated report conforms to the following example:

```
License check output generated on: Sun May 30 19:20:27 2004

Active HSM client(s): 3
    tuxfse04.hp.com, tuxfse04 , 192.168.0.84 192.168.12.72
    tuxfse09.hp.com, tuxfse09 , 192.168.0.93
    tuxfse12.hp.com, tuxfse12 , 192.168.0.110

Total storage capacity maintained by the HSM server:
    12.00 TiB
```

You can store the report into a file for later use using standard output redirection technique:

```
checklic >checklic-output.txt
```



# Recommendations

## 3

This chapter includes some recommendations to improve performance and minimize problems.

## General Recommendations

### Keeping the FSC and HSM Journals Small

The journals of File System Catalog (FSC) and Hierarchical Storage Manager Database (HSMDB) can grow quite big throughout FSE daily usage and can occupy considerable amount of disk space. However, they are truncated every time the FSE system is backed up successfully. By backing up the FSE system regularly, the size of the journals remains acceptable.

#### Linux specific

FSC journals are located in

```
/var/opt/fse/part/<PartitionName>/fsc/journal
```

HSM journals are located in

```
/var/opt/fse/part/<PartitionName>/hsm/journal
```

#### Windows specific

FSC journals are located in

```
%InstallPath%\var\part\<PartitionName>\fsc\journal
```

HSM journals are located in

```
%InstallPath%\var\part\<PartitionName>\hsm\journal
```

### Handling Old FSE Log, Debug and Disk Buffer Files

If tracing of the FSE system is enabled, FSE log and debug files can grow quite big through FSE daily use. The FSE disk buffer files can also occupy a significant amount of disk space if they are accidentally left on disk.

### Linux specific

To prevent the disk from being filled up, HP recommends that you execute the `fse_cleantmp.sh` script regularly. Use the `crontab` command to schedule the script.

`fse_cleantmp.sh` performs two different tasks:

- It archives FSE log and debug files older than the defined number of days set for the archiving task.
- It deletes archives older than the defined number of days set for the removal task. Originals of the archived files are always deleted unless they are currently used by an FSE process or are meant to be used later. FSE disk buffer files are handled in the same manner.

### Windows specific

If you are concerned with excessive growth of FSE debug files, consider allocating a dedicated disk partition/volume to a file system, which can then be mounted to `%InstallPath%\var\log\debug`.

## Shortening the Termination Delay for FSE Commands

FSE uses CORBA technology and its omniORB implementation for its internal interprocess communication. omniORB also prepares and initializes the environment in which an FSE process is run, and cleans up the environment after the process is terminated. This takes time.

The FSE process clean-up may be noticed when working with FSE commands. After an FSE command completes its task, it returns control to the command prompt after a short delay. This is because the command, after termination, leaves its connection open until the omniORB thread terminates it. omniORB scans for idle connections at regular intervals. A shorter interval will result in a shorter delay after the FSE command termination.

To shorten this interval, add the following line to `omniORB.cfg` to set the scanning interval to 1 second:

```
scanGranularity = 1
```

`omniORB.cfg` is located in the directory `/etc/opt/fse` (on Linux systems) or `%InstallPath%\etc\` (on Windows Systems).

**Note:** Note that no FSE system restart is necessary for changes in `omniORB.cfg` to take effect, and that its reconfiguration affects all local FSE processes, not only FSE commands.

---

## Windows-Specific Recommendations

### Improving Performance of the FSE-Samba Integration

You can improve performance of clients running on Windows NT/2000/XP platforms using Samba shares on the HSM file systems.

Performance can be improved by modifying the timing parameters of the Workstation Service (formerly LAN Manager), depending on the particular environment load and usage policy. These parameters are described in Microsoft Knowledge Base articles Q102981 and Q102067.

The articles mention default values for particular registry keys that affect Samba communication. For more details, refer to the web sites:

<http://support.microsoft.com/default.aspx?scid=KB;EN-US;Q102981>

<http://support.microsoft.com/default.aspx?scid=KB;EN-US;Q102067>

---

**Note:** Modifying the values of timing parameters can worsen or improve the Samba performance. Be especially cautious when setting the value for the redirector session time-out parameter (`SessTimeout`).

---

### Enabling Early Migration of the Data Located on a Former NTFS Volume

After a non-empty NTFS disk volume is assigned to a newly configured FSE partition, the volume is mounted using the HSM file system in Full Access Mode. Existing directories and files are added to the HSM migration candidate list when they are accessed for the first time. There may be a long delay before a particular directory or file is actually migrated.

To speed up the migration process, you are advised to run a tree walk on such an HSM file system. The tree walk process must be performed by a third-party application or tool, not by an FSE command.

The following is an example of a tool that you can use for this purpose. The `dir` command scans through the whole HSM file system hierarchy of the disk volume and puts each object on the migration candidate list. Before invoking the command, change the current directory to the mount point of the HSM file system:

```
<VolumeMountPoint>\>dir /S
```

# Limitations

## 4

This chapter details known limitations of the current FSE release, and where appropriate, provides possible solutions.

- For limitations common to Linux and Windows, see page 29
- For Linux limitations, see page 31
- For Windows limitations, see page 33.

## Common Limitations

### FSE Client–Server Connection Limitation

The FSE installation does not support a proxy server or a firewall between the FSE client and the FSE server. The FSE installation only works if there is a direct LAN connection with full-duplex transmission between the FSE client and FSE server.

### Available Media Space Calculation Limitation

The `fsemedium --list --volume` command reports three statistics related to the used and free space on the FSE medium volumes:

- **Size:** Amount of total space on an FSE medium volume in MB.
- **Avail:** Amount of free space on the medium volume in MB.
- **Used:** Percentage of used space on the medium volume.

As the **Used** parameter is increased in steps of 1%, and the **Avail** parameter is calculated from the **Size** and **Used** parameters, the value of the **Avail** parameter is only updated if the percentage of used space has been changed by at least 1%. This means, if the total size of the migrated files in an FSE migration job does not exceed 1% of the total space on the medium volume, the value of the **Avail** parameter will not change after the migration is complete.

## Duplicating AIT-3 and AIT-3 WORM Media

Due to a problem in the current firmware version of the supported AIT-3 / AIT-3 WORM tape drives, the AIT-3 and AIT-3 WORM media cannot be duplicated using the FSE system's `fsemedium --copy-contents` command.

## Using Third-Party Backup Software for Backing Up the FSE System

The FSE installation uses a proprietary backup tool for backing up its current state to tape media. It does not support any third-party backup applications. Using such applications for backing up the FSE system would cause several problems, including recall of the offline files (if used for backup of the FSE clients) and potential inconsistency or data corruption of the FSE databases and system files (if used for backup of the FSE server).

Therefore, you are advised not to install and use third-party backup applications on a system that hosts FSE software.

## Internet SCSI (iSCSI) Not Supported

FSE does not support devices that use the Internet SCSI (iSCSI) protocol for data transfer.

## Configuring SAN Environments to Prevent Potential Data Loss

Tape devices that are shared among several computers (as part of a SAN environment) may occasionally rewind FSE tape media due to bus resets induced by one of the connected computers. Such events are most often handled internally by a switch or bridge and do not reach Back-End Agents (BEA) that manage data transfer to the devices. In this case, the bus resets are not handled by the FSE system. These may cause data loss on the FSE media involved, if they occur while the data is being transferred from the FSE disk buffer to the media.

The following is an example of an error message that may be written to the FSE error log file after a bus reset and the consequent FSE tape media rewind:

```
CRITICAL ERROR: Internal error. Contact support. (5: MAJOR
INTERNAL ERROR: Data corruption detected. 'Counted medium position
(395405) is different from actual (12897). Job:
20040607000206Medium/volume: 000391/1').
```

Other messages that can be displayed are:

```
(5. MAJOR INTERNAL ERROR: Data corruption detected. 'Data loss
detected. Medium was overwritten. See error log. Medium/volume:
000391/1')
(5. MAJOR INTERNAL ERROR: Data corruption detected. 'Medium
position changed to 0. Aborting. See error log. Medium/volume:
000391/1')
```

Proper operation of the FSE system in a SAN environment is guaranteed only if the SAN switch or bridge is configured in such a way that it propagates bus reset errors. The errors can then be detected and handled appropriately by the FSE system, and data loss can be prevented.

## Reusing File Systems for Newly Configured FSE Partitions

FSE does not allow existing HSM file systems to be assigned to newly configured FSE partitions. You can configure a new FSE partition and use the `fsepartition --add` command only if a native file system with non-HSM directories and files is specified in the FSE partition configuration file. Such a file system can be either an Ext3 file system (on Linux systems) or NTFS (on Windows systems), provided that it has not been used as an HSM file system before.



**Caution:** Data loss will occur during FSE system operation if you try to reuse a file system that was previously used as an HSM file system by assigning it to a new FSE partition.

---

You can however reuse disk space occupied by an HSM file system by deleting the file system and creating a new one in its place (by running the `mkfs` command on Linux systems or formatting the disk volume on Windows systems).

## Linux-Specific Limitations

### Special File Types Are Not Supported

The FSE system does not support handling of special file types. On Linux systems, the following file types are not supported:

- char devices
- block devices

- sockets
- pipes

Consequently, these files cannot be created on an HSM file system.

## Directories with Sticky Bit Not Supported

The FSE system does not support handling of "sticky directories", that is, directories with the sticky bit set. Such directories cannot be copied to HSM file systems and the sticky bit cannot be applied to existing directories on HSM file system.

The sticky bit is represented with the attribute character `t` or `T` in the output of the `ls` command, as shown in this example:

```
-rwxrwxrwx 1 root root 16932 Nov 26 08:02 file
drwxrwxrwx 2 root root 4096 Nov 26 09:38 non_sticky_dir
drwxrwxrwt 2 root root 4096 Nov 26 08:26 sticky_dir
drwxrwxrwt 2 root root 4096 Nov 26 09:36 sticky_dir_2
```

If you try to copy a sticky directory to an HSM file system or try to modify the attributes of an existing directory on an HSM file system to include the sticky bit, the `cp` and `chmod` commands fail with the following errors:

```
cp: cannot create directory `/mnt/hsmfs01/test': Operation not
permitted

chmod: changing permissions of `/mnt/hsmfs01/test': Operation not
permitted
```

The reason for this limitation is Ext3 extended attributes, which are used by the FSE system, but cannot be added to sticky directories.

## Pathname Length Limitation

An FSE system cannot gain control of files whose full pathname exceeds 4096 characters. A full pathname consists of the absolute path of the file (including path separators—slashes) and the name of the file. Absolute path means the path from the root directory of the root file system. Files with overlong pathnames remain dirty forever; they are never migrated to FSE media and therefore cannot be released from the HSM file system.

## Windows-Specific Limitations

### Unsupported Windows Services and File System Features

FSE system does not operate in some Windows environment configurations and does not support some Windows services and NTFS file system features:

- Microsoft Cluster Server environment is not supported.
- Windows Terminal Server or Citrix Metaframe interoperability is not supported.
- Removable Storage Manager (RSM) interoperability is not supported. RSM must be disabled to enable normal FSE system operation.
- Remote Storage Service (RSS) interoperability is not supported. RSS must be disabled to enable normal FSE system operation.
- NFS server products running on top of the FSE system are not supported.
- Distributed File System (DFS) integration with the FSE system is not supported.
- Encryption File System (EFS) and FSE file system integration is not supported. EFS encrypted files should not reside on the HSM file system.
- HSM file system does not support compressed files.
- Operating system components and installed applications cannot reside on the HSM file system (page file, system restore data, temporary files, binaries, and DLL files).
- Junction points, resource forks, and reparse points cannot reside on the HSM file system.
- FSE system interoperability with File Replication Services is neither tested nor certified.

### Unsupported Third-Party Software

FSE cannot be integrated with certain third-party software for storage management, device management, and system security. FSE will not operate on systems where any of the following applications is installed:

- VERITAS StorageCentral
- Microsoft iSCSI Software Initiator
- Microsoft Firewall Client 2004

## Move Operations to Overwrite Existing Files on HSM File System Are Denied

FSE prevents move operations to overwrite existing files on the HSM file system which could lead to missing delete events. Attempts to move to overwrite an existing file is denied and the move operation fails. For a move operation to succeed, you need to remove the target file or directory first.

## Recycle Bin Must be Disabled on FSE System

FSE does not support the Recycle Bin for HSM file systems. The Recycle Bin must be disabled for all HSM file system volumes since the files cannot be restored back to these volumes. Note that the disabling is performed automatically during the installation of FSE, and no action from the FSE administrator is required.

To disable the Recycle Bin, change the following registry key to the suggested value:

```
\HKEY_LOCAL_MACHINE
\SOFTWARE
\Microsoft
\Windows
\CurrentVersion
\Explorer
\BitBucket: NukeOnDelete [REG_DWORD] = 1
```

---

**Note:** This registry key affects the whole system, so once it is modified, the Recycle Bin is not available for other disk volumes either.

---

## After Installing Microsoft Office XP, HTML Files Are Recalled Once

Once Microsoft Office XP is installed and Windows Explorer just lists HTML files (before you drag the mouse over them), it induces a recall process for the listed HTML files. However, after the HTML files have been released they will not be recalled in subsequent listings.

## Pointing to Files in WinZip and Total Commander Triggers Recall

With WinZip installed, dragging the mouse over an offline .zip file in Windows Explorer triggers a recall of the file.

Something similar happens in Total Commander (old name Windows Commander), where pointing the cursor onto directory that contains an offline .zip files triggers a recall of all offline .zip files in that directory. Such unwanted recalls occur regardless of WinZip presence, because of Total Commander's own Zip plug-in.

## Defragmentation of HSM File Systems Not Supported on Windows 2000

On Windows 2000 Server systems, defragmenting HSM file systems with Disk Defragmenter, the Windows disk defragmentation tool, or any other third-party defragmentation utility is not supported. Defragmenting a HSM file system causes file system corruption and can result in data loss.

If defragmentation is attempted on an HSM file system that belongs to an enabled FSE partition, the HSM file system filter prevents the corruption by triggering the blue screen (sometimes referred to as the *blue screen of death*). If the same action is attempted on an HSM file system that belongs to a disabled FSE partition, the defragmentation will succeed. However, after enabling the FSE partition, the defragmented files whose ID has changed will appear as being newly created on the HSM file system.

## Limited Support for Windows Disk Checker

On a consolidated Windows FSE system or an external Windows FSE client, you should not use the system native `chkdsk` command for checking disk volumes with HSM file systems while local FSE processes are running. If you do, it will trigger the blue screen of death (BSOD). If you want to run `chkdsk` on such a volume, first stop the local FSE system operation by invoking the `fse --stop` command.

On a Windows Server 2003 system that has been updated with Windows Server 2003 Service Pack 1 (SP1), the above limitation does not apply. On such a system, you can run `chkdsk` even when FSE processes are running.



# Known Issues and Workarounds

## 5

*Description:* **Running the commands `fsefile --migrate` followed by `fsefile --trigger-migration` in sequence does not start migration job.**

*Explanation:* `fsefile -- migrate` does not add files to the migration list, but rather to the dirty files list. Therefore, running `fsefile --trigger-migration` shortly after the file was added to the dirty files list does not have any effect.

*Workaround:* When the file is added to the dirty files list, wait for it to be migrated according to the migration policy.

---

*Description:* **Problems with detecting hardware such as SCSI cards, LAN cards (Linux specific).**

*Explanation:* Problems when using an ASUS PR-DL533 motherboard: Linux does not detect hardware correctly. It is a known problem of the Linux ACPI subsystem that it does not work correctly with some motherboards. If specifying the general `acpi=off` option, it is possible that the ACPI subsystem does not detect the hardware (on-board network card, SCSI card) correctly.

*Workaround:* Specify the following boot parameters:

```
acpi=oldboot pci=noacpi apm=power-off
```

---

*Description:* **Random failures with tape drives/library.**

*Explanation:* On highly loaded systems, SCSI resets may happen on the SCSI bus. This may lead to some low-level problems with the attached devices (tape library or drives).

*Workaround:* Consider using dedicated SCSI bus (card) for connecting the tape library to your system (and use other SCSI buses/cards for drives). In case of repeated failures, check the cabling (shielded cable is recommended), SCSI terminators (active terminators are recommended) and the power supply.

---

*Description:* **Volume overflow when initializing empty media volumes.**

*Explanation:* In some cases if a medium is bad, this might not be detected immediately by the drive. It is possible that the tape drive skips bad areas of the medium until it reaches the end of the medium.

If this happens, then a misleading SCSI error is reported. For example:

```
fse_Error: 11005: Medium overflow (physical EOM).  
Volume Overflow ([0x00,0x02] End-of-partition/medium detected.
```

The current operation fails. The next time an attempt is made to use this medium, the drive detects it is bad and marks it accordingly.

*Workaround:* None

---

*Description:* **Files are not migrated because the file system ran out of free space.**

*Explanation:* The FSE system stops migrating files if a file system for the `/var/opt/fse` mount point runs out of free space.

*Workaround:* Under special circumstances, such as when there are many small files or many changes of file properties, Fast Recovery Information (FRI) requires a large amount of disk space. You need to dedicate enough disk space for the file system on the `/var/opt/fse` mount point to prevent the file system running out of free space.

---



**Caution:** This is potentially dangerous since it can result in corrupt FRI files. You can prevent this by calculating the expected FRI size and dedicating enough disk space for the file system holding temporary FRI data files.

---

Use the following formula to calculate the expected FRI size:

$$Sfri = \frac{Nv \times Sv \times [(Lf + 350) \times Nm / Tbks]}{[Sf \times Nm / Tbks]}$$

where:

*Sfri* Estimated maximum size of FRI files on disk.

*Nv* Total number of open FSE medium volumes in the FSE system. This number is determined by the number of configured FSE media pools that contain media with migrated files.

*Sv* Size of an FSE medium volume on tape.

*Sf* Average size of files being migrated.

*Lf* Average filename length of files being migrated.

- Nm* Average number of files migrated in the same migration job.
- Tbks* Block size on tape medium. Note that this only applies if all FSE media pools are configured with the same block size.
- [x]* The value in the brackets rounded up to the nearest integer.
- 

*Description:* **Command `fse --stop` is not able to stop all FSE processes or abort all FSE jobs.**

*Explanation:* On heavily loaded systems, the `fse --stop` command is not able to abort all jobs within a short time, especially if at the same time, new jobs are created.

*Workaround:* To terminate the FSE system operation on such systems:

1. Stop all non-FSE processes which are creating files on the HSM file system.
  2. Unmount the HSM file systems.
  3. Abort all FSE jobs using commands `fsejob --list` and `fsejob --abort`.
  4. Stop all `fse` jobs using `fse --stop` command.
- 

*Description:* **A bad drive cannot be removed if a medium is still in it.**

*Explanation:* When trying to remove a drive from the FSE system, the command `fsedrive --remove <Name>` reports a problem when trying to unload the medium, and the drive cannot be removed from the system.

*Workaround:* If the medium could not be unloaded, you must identify the reason and unload the medium manually.

Then place the medium into a free slot in the FSE library and enter the command: `fselibrary --update-inventory <LibraryName> --rescan` to trigger an inventory update and rescan the inventory.

When complete, remove the drive using the command `fsedrive --remove <Name>` again.

---

*Description:* **FSE backup problems (Linux FSE server-specific).**

*Explanation:* Backup uses `tar` to pack all data that needs to be backed up. If a `tar` command has already been started and in the meantime a backup job is aborted, the job hangs until the `tar` command completes. This might be time consuming if FSE contains a lot of data to be backed up.

**Workaround:** In this case, the FSE server system must be cleaned up after the abort command. To clean up the FSE server, proceed as follows:

1. Kill all processes named `fse-dd` or `tar` (using the directory `/tmp/.fse`).
2. Unmount all mounted volumes in the `/tmp/.fse` directory.
3. Remove all snap logical volumes. The example shows removing snap logical volumes in the `/dev/vg_fse` directory, but make sure you use the FSE volume groups on your system:  

```
lvremove -f /dev/vg_fse/fsevar_snap
```

Similarly, when a backup job hangs, the system must be cleaned up using the described procedure before a new backup job is started. This happens because any unfinished backup job prevents a new backup from being started.

---

**Description:** `rmdir` also deletes mount points

**Explanation:** If an FSE volume is mounted to the directory, for example:

```
fse --mount i:\fse\fsefs_01 \\?\Volume{...}\,
```

and then `rmdir` is executed, for example:

```
rmdir /S /Q i:\fse\fsefs_01\,
```

it deletes all files and directories together with the mount point.

**Workaround:** You need to redefine the FSE volume and mount it using the `fse --mount` command. See Chapter 2 of the *FSE User Guide* for details.

---

**Description:** **Initialization of media fails with large block size (Windows system-specific).**

**Explanation:** This happens because some Windows SCSI or FC host bus adapter (HBA) drivers (particularly Adaptec) do not support large block sizes by default. You can enlarge the scatter/gather list value to increase the transfer size beyond 64 KB.

**Workaround:** Change the registry setting to allow the lists to be expanded to up to 255 elements. Manually update the registry as follows.

1. Run `REGEDT32` to edit the system registry.
2. Go to `\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\  
<DriverName>Parameters\Devicen`  
(where the *DriverName* is the name of the miniport driver, for example `AIC78XX`, and *n* in `Devicen` is the bus number assigned at initialization).
3. Go to Edit > Add Value for `REG_DWORD` Data Type and enter *MaximumSGList* for value. Enter **FF** for Value data (FF is equal to 255), and make sure that the **Hex** option is set.

4. Exit the Registry Editor and restart the system.

---

*Description:* **After formatting an FSE partition, the FSE partition is not mounted and HSM does not start (Windows system-specific).**

*Explanation:* This happens because formatting remounts the volume and the file system filter cannot attach to it. You need to unmount the partition first and only then mount it.

*Workaround:* To mount the FSE partition, proceed as follows:

1. Unmount the FSE partition on a client using `fse --umount`.

2. On the FSE server, disable the FSE partition using the command:

```
fsepartition --disable PartitionName
```

Instead of disabling it, you can also remove it by running:

```
fsepartition --remove PartitionName
```

3. Format FSE partition on client using Disk Management (Start > Settings > Control Panel > Administrative Tools > Computer Management > Storage > Disk Management).

If there have been any partition schema changes, restart the appropriate FSE client.

4. On the FSE server, depending on step 2, you need to enable the FSE partition if it was disabled, or add it if it was removed.

To enable the FSE partition, use the command:

```
fsepartition --enable PartitionName
```

To add it, use the command:

```
fsepartition --add PartitionName
```

5. Mount the FSE partition on the client using `fse --mount`.

---

*Description:* **Formatting the FSE partition fails (Windows system-specific).**

*Explanation:* Formatting can fail if FSE is not running on the client. The file system filter, which intercepts and can block actions for file systems, recognizes the stopped FSE system. In such a case, formatting a file system will most likely fail.

*Workaround:* Mount the FSE partition as described in the previous workaround before formatting it.

---

*Description:* **File migrations in an FSE system with a Windows FSE server appear to run slow.**

*Explanation:* The Removable Storage service may be running on the Windows system. This operating system service interferes with the FSE processes causing a serious performance degradation of the FSE migration job.

*Workaround:* Stop the Removable Storage service and disable its automatic startup. Proceed as follows:

1. Run `Services` by selecting `Start > Settings > Control Panel > Administrative Tools > Services`.
2. In the Name column, search for the Removable Storage entry, right-click and select Properties.
3. In the Startup type drop-down list, select Disabled.
4. Stop the service by clicking the Stop button.

---

*Description:* **A recall job does not search for alternative copies if the FSE medium status is set to “unusable” after the allocation.**

*Explanation:* This can happen in the following situation:

- A running FSE recall job has determined from which FSE medium the data will be recalled but is still waiting for that medium to become available (probably because another FSE job has allocated the same medium).
- During this waiting time, the medium is set to “unusable” but the waiting recall-job is not notified of this change.

The recall job will continue to wait for the medium to become “good”, and therefore it will not search for available redundant copies migrated to other FSE media pools, if any exist.

*Workaround:* Using the `fsejob` command, identify and terminate all FSE recall jobs that are waiting for the unusable FSE medium to become good.

If there are alternative copies of the migrated data in other FSE media pools, the subsequent FSE recall jobs will allocate an FSE medium from one of those pools, and recall the data from it.

---

**Description:** In a private network environment, the FSE system does not start after the YaST2 configuration tool is run (Linux system-specific).

**Explanation:** On a Linux system equipped with two network adapters, YaST2 modifies the `/etc/hosts` file and assigns the IP numbers of both network adapters to the primary host name. omniORB cannot work with such a configuration.

**Workaround:** Manually edit the `/etc/hosts` file and revert back to the old host-name settings.

---

**Description:** Rename or move actions on offline files cause file recalls, if performed over a network share from a Windows system with Norton AntiVirus installed (Windows FSE client-specific).

**Explanation:** Norton AntiVirus ignores the offline file attribute of files located on remote HSM file systems on the Windows FSE client. The rename or move operation causes the files to be recalled for scanning against viruses.

**Workaround:** In Norton AntiVirus, disable scanning of the network drives that are mapped to the remote HSM file systems.

---

**Description:** Running Disk Defragmenter on a HSM file system triggers the *blue screen* (Windows FSE client-specific).

**Explanation:** Defragmenting HSM file systems is not supported as the defragmentation of an HSM file system causes corruption and data loss. HSM file system filter triggers the blue screen (sometimes referred to as the *blue screen of death*) in order to prevent the defragmentation process from actually starting the defragmentation of the HSM file system.

**Workaround:** None

---

**Description:** Uninstalling FSE release software does not remove all files and directories created (Windows system-specific).

**Explanation:** The following directories are not removed by the FSE InstallShield wizard during the uninstallation:

- Program Files\Hewlett-Packard\FSE\bin

This directory contains subdirectories with Python \*.pyc files. It also contains FSE GUI binary files, if the FSE GUI package is installed on the local system.

- Program Files\Hewlett-Packard\FSE\newconfig

This directory is empty.

**Workaround:** Manually delete both directories and their contents.

Please note that you can only delete the directory  
`Program Files\Hewlett-Packard\FSE\bin` if the FSE GUI package is not installed on the system.

---

**Description:** **LTO and disk FSE media pools can be incorrectly configured as media pools of the WORM type.**

**Explanation:** When configuring an LTO or disk FSE media pool (the *MediaFamily* variable), you can specify WORM for the media pool type (the *PoolType* variable). The configuration will succeed, although the LTO-WORM and disk-WORM media are not supported by the FSE system.

Note that formatting an FSE medium assigned to such incorrectly configured media pools will fail.

**Workaround:** None

---

**Description:** **At the end of an HSM file system recovery, some files are reported as being “reserved” in the output of the `fserecover` command.**

**Explanation:** The word “reserved” means that file IDs were assigned to new files on the HSM file system, but these files had been either deleted or changed before they could have been migrated using these particular file IDs. Such file IDs were only recorded in the File System Catalog. These files have been migrated using other, newly generated, file IDs. The “reserved” entries therefore, do *not* indicate data loss.

**Workaround:** None

---

**Description:** **If an FSE partition is removed from the FSE system configuration, with the assigned HSM file system left intact, this HSM file system cannot be mounted again even if the FSE partition is configured with the same parameters (external client-specific).**

**Explanation:** The HSM DB, located on the external FSE client, is not removed during removal of the FSE partition.

**Workaround:** After removing the FSE partition from the FSE system configuration, manually, delete the corresponding `/var/opt/fse/part/<PartitionName>` directory and its contents from the external FSE client.

---

**Description:** After reconfiguring an FSE drive, the FSE system loads or unloads a different FSE drive instead of the newly reconfigured drive.

**Explanation:** During reconfiguration, the Library Agent is not notified about the new drive device file (on Linux systems) or drive device ID (on Windows systems), and still uses the old device file or ID.

**Workaround:** After an FSE drive is reconfigured with a modified *ControlDevice* variable, restart the FSE system using the `fse --restart` command.

---

**Description:** A recall from an AIT medium fails and writes the following error to the FSE event log:

**MAJOR INTERNAL ERROR: Data corruption detected. 'State on medium doesn't match FSC. See error.log.**

**Explanation:** Migration of the requested offline file generation has not completed successfully, most probably because the physical end-of-medium notification was not reported by the AIT drive soon enough, resulting in part of the file data not being written to the tape.

**Workaround:** None

---

**Description:** Backup process fails and leaves snapshots of the backed-up file systems (and HSM file systems) on the FSE server (and the FSE clients).

**Explanation:** Backup failure prevents the clean-up code to unmount and remove the snapshots that were created during backup. These snapshots occupy space on the FSE server (and the FSE clients), and also prevent you from running subsequent backups.

**Workaround:** On the consolidated FSE installation or the FSE sever, run the `release_snap.py` script to unmount and remove the snapshots that were created during the backup of the FSE system. Caution: The command lists all existing snapshots, not only the ones that were created during the backup of the FSE system. Before removing a snapshot, the script asks for confirmation. This way, you can preserve the snapshots that were not created by the FSE system.

On a Linux system, run the following command to execute the script:

```
python /opt/fse/sbin/tools/release_snap.py
```

On a Windows system, run the following command to execute the script:

```
%PP%\python.exe %InstallPath%\bin\release_snap.py
```

Use the actual Python installation path in place of the `%PP%` string. Note that `%InstallPath%` defaults to `Program Files\Hewlett-Packard\FSE`.

---

**Description:** Free space on an HSM file system runs out and the following error is written to the kernel ring buffer (displayed by the `dmesg` command):  
**[CRITICAL] FSE-HSM not listening for FS events! Unmount FS and check FSE logs for more details! (Linux system-specific).**

**Explanation:** n/a

**Workaround:** To solve this critical situation, proceed as follows:

- Stop the FSE system using the `fse --stop` command.
- Extend the size of the volume that stores the HSM file system. Use the `lvextend` command for this purpose.
- Reconfigure the corresponding FSE partition with modified values for the *CriticalWatermark*, *HighWaterMark*, and *ReleaseInterval* variables to prevent the HSM file system from becoming full.
- Start the FSE system using the `fse --start` command.
- To identify potential inconsistencies, run the `fsecheck --fsc-hsmfs` command on the FSE partition containing the HSM file system which became full.

---

**Description:** Execution of the `fsecheck --fsc-media` command seems to complete successfully, however, the following message is written to the FSE event log:  
**ERROR: FAILED creating new FRI... ...No space left on device.**

**Explanation:** The file system that stores the temporary Fast Recovery Information files (located in the `/var/opt/fse/fri` directory on a Linux FSE server, or the `%InstallPath%\var\fri` directory on a Windows FSE server) ran out of free space.

In this case, the results of the FSE check job are incorrect and should not be considered.

**Workaround:** Extend the size of the volume that stores the file system for the `/var/opt/fse/fri` (on a Linux FSE server) or the `%InstallPath%\var\fri` directory (on a Windows FSE server), and run the consistency check again.

The formula for the estimated maximum size for the temporary Fast Recovery Information files is given in the *FSE Installation Guide*. Note that for space requirements of the `fsecheck --fsc-media` command, instead of the number of currently open FSE medium volumes the total number of full and open medium volumes has to be considered for the `nv` variable.

---

**Description:** On a heavy loaded FSE client, after mounting an HSM file system that has reached the critical watermark, many migration jobs are triggered and the FSE system becomes unresponsive (Windows system-specific).

**Explanation:** In the above circumstances, a race condition between the HSM file system filter and NTFS occurs. This leads to a deadlock that blocks the system.

**Workaround:** Proceed as follows:

1. Reconfigure the affected FSE partition with the *ReleaseInterval* variable set to some large value, for example 24h.
2. Restart the FSE client system.
3. Start the FSE system on the FSE client.
4. If the FSE partition has not been mounted automatically, mount it using the `fse --mount` command.
5. Prevent any change of data on the FSE partition and wait for pending migration jobs on the partition to complete.
6. Unmount the FSE partition using the `fse --umount` command.
7. Reconfigure the FSE partition with the *ReleaseInterval* variable reset to its original value.
8. Mount the FSE partition and resume with normal FSE system operation.

---

**Description:** During the execution of an FSE deletion job, warnings are not logged in the FSE event log file for non-existing paths.

**Explanation:** Paths specified in the *Path* variable in the deletion-policy part of an FSE partition configuration file are not checked to see if they exist during execution of the corresponding FSE deletion jobs on this partition.

**Workaround:** None

---

**Description:** Recreating Fast Recovery Information (FRI) on a closed but empty FSE disk medium volume fails.

**Explanation:** Closed FSE disk medium volumes which are empty are not handled correctly by the Back End Agent.

**Workaround:** Do not recreate FRI on empty closed FSE disk medium volumes.

---

*Description:* **Installation process of Red Hat Enterprise Linux 3 does not detect disks in the correct order, thus obstructing the installation from succeeding.**

*Explanation:* On a system with SCSI host bus adapters attached, if kernel modules for these adapters are not loaded in time, the disk order as detected by the RHEL 3 installation differs from that detected by the BIOS. In this case, the actual start-up disk may not be shown as being the first disk.

*Workaround:* Start the RHEL 3 installation in expert mode and ensure the modules for the adapters attached to the system are loaded in the appropriate sequence. For example, load the module for the adapter to which boot disk is connected first, followed by modules for all other adapters.

To start the RHEL 3 installation in the expert mode, boot the system from the RHEL 3 installation CD-ROM, wait for the command prompt, and invoke the following command: `expert noprobe`.

---

*Description:* **After installation of SUSE LINUX Enterprise Server 8 on a system with network adapters using both copper and fibre cabling and the same driver, the network is not accessible.**

*Explanation:* Even though it seems that you have successfully configured all network adapters in YaST2, due to a problem in YaST2 the network adapters are actually misconfigured. YaST2 only managed to assign an `ethX` device to each of the adapters.

*Workaround:* Use the command line tool `ethtool` to determine the `ethX` device of a particular network adapter and if the adapter is connected to LAN. Using `ethtool`, you can then configure the adapters and assign the corresponding addresses.

The following is an example of the `ethtool` output. Note the lines marked in bold:

```
# ethtool eth0
Settings for eth0:
    Supported ports: [ TP ]
    Supported link modes:   10baseT/Half 10baseT/Full
                           100baseT/Half 100baseT/Full
                           1000baseT/Full
    Supports auto-negotiation: Yes
    Advertised link modes:  10baseT/Half 10baseT/Full
                           100baseT/Half 100baseT/Full
                           1000baseT/Full
    Advertised auto-negotiation: Yes
    Speed: 100Mb/s
    Duplex: Full
    Port: Twisted Pair
    PHYAD: 0
```

```
Transceiver: internal
Auto-negotiation: on
Supports Wake-on: umbg
Wake-on: g
Link detected: yes
```

---

*Description:* **When you modify attributes of an offline file through a Samba share, the file is recalled from the FSE media (Linux system-specific).**

*Explanation:* The customized Samba server running on a Linux system apparently reads part of the file contents after a file attribute is changed remotely from a Samba client.

*Workaround:* None.

---

*Description:* **If the I/O traffic on an HSM file system is very high, the Hierarchical Storage Manager (HSM) process may stop reading file system events and completely block access to the HSM file system (Linux system-specific).**

*Explanation:* n/a

*Workaround:* Terminate all user applications that are currently trying to access the HSM file system, including NFS and Samba daemons.

---

*Description:* **When you try to run an executable file located on an HSM file system and the file is currently offline, the operation fails and reports an EBUSY error (Linux system-specific).**

*Explanation:* n/a

*Workaround:* Before running an executable file that is currently offline, recall it manually to the HSM file system using the `fsefile --recall` command.

---

*Description:* **After restore of an HSM file system, files that were previously deleted from the HSM file system are recreated, but online files that still existed are truncated (Windows FSE client-specific).**

*Explanation:* n/a

*Workaround:* Delete the files from the HSMFS and start the restore again.

---

**Description:** If the FSE 3.1 release files are installed on a separate disk volume mounted to the FSE installation directory (%Program Files%\Hewlett-Packard\FSE by default), upgrading the installation removes the mount point and installs the updated files to the “root” disk volume instead.

**Explanation:** n/a

**Workaround:** On a system on which FSE 3.1 software release will be installed, the FSE installation directory (%Program Files%\Hewlett-Packard\FSE by default) should not be a mount point for a separate disk volume.

However, the parent directory of any directory that is located higher in the file system hierarchy can have a separate disk volume mounted to it.

---

**Description:** If reorganization of an FSE medium volume fails for any reason, you cannot re-run the reorganization job for the volume because the “scanned” indicator is removed from the medium volume status.

**Explanation:** n/a

**Workaround:** Solve the problem that caused the FSE reorganization job to fail, and then run the command `fsepartition --reorg-scan` to scan the appropriate FSE medium volumes again.

---

**Description:** After the redundant copy recreation process finishes, the parameter that indicates the usage of FSE disk buffer in the Resource Management Database (RMDB) gives an incorrect value.

**Explanation:** The redundant copy recreation process deallocates more FSE disk buffer space than it actually allocated when the job started.

**Workaround:** To set the FSE disk buffer usage in the RMDB to a correct value, restart the FSE system.

---

**Description:** While reading data from an FSE tape using an AIT-3 WORM tape drive, the operation may fail with the following error reported in the FSE error log: **12010: Critical sense key. 'Aborted Command (... Initiator detected error message received)'**.

**Explanation:** Power of the tape drive was probably recycled.

**Workaround:** The following procedure may help:

1. Use the `fse_scsi` tool to unload the FSE tape manually from the drive.
2. Use the same tool to load the same tape into the same drive again.

3. Repeat the operation that failed.

---

*Description:* **Deleting disk volumes on a consolidated FSE system or an FSE client with configured HSM file systems may result in an inoperable FSE system (Windows system-specific).**

*Explanation:* After a disk volume is deleted from the system, indices of the disk volumes that store HSM file systems may get updated. In such circumstances, the HSM file system filter may attach to improper volumes, and consequently cease normal FSE system operation.

*Workaround:* Do not change the disk partitioning schema on a system if HSM file systems are already configured locally.

---

*Description:* **After an internet shortcut located on an HSM file system has been released, it cannot be opened. The following error message is displayed after clicking on such a shortcut:**

***on Windows Server 2003 systems:* The target “<target>” of this Internet Shortcut is not valid. Go to the Internet Shortcut property sheet and make sure the target is correct.**

***on Windows 2000 Server systems:* The Internet shortcut cannot be opened because failed to run.**

*Explanation:* n/a

*Workaround:* Exclude internet shortcuts from being released by reconfiguring the corresponding FSE partition with the appropriate *ExcludeFromRelease* variable. For more information, see the comments in the FSE partition configuration template.

---

*Description:* **A device connected to the SCSI or Fibre Channel HBA does not work correctly. Some operations are faulty or do not work.**

*Explanation:* The root cause of the problem may be that your HBA does not support direct SCSI pass-through mode, the default mode for SCSI operation used in the FSE system.

*Workaround:* Verify that you have the latest driver version for your HBA installed on the system. If not, update the driver.

If the problem persists, use the *HSM\_PT\_DIRECT* variable to enable buffered SCSI pass-through mode. For instructions on how to do this, see “[New Variable HSM\\_PT\\_DIRECT in trace.cfg](#)” on page 14.

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